

# GREEN MATTERS

Issue 30  
Winter 2007

A newsletter from the Alberta Environmentally Sustainable Agriculture Council

## Keeping Soil Conservation on our Radar Screen

### From AESA Council's Chair

By Larry Kitz, *Northern Regional Committee*

As the Alberta Environmentally Sustainable Agriculture (AESA) Program enters into its 10th year, we can look back on the successes the program has enjoyed so far. Beneficial management practices (BMPs) are being adopted across Alberta, and some practices that were rare at one time, like swath grazing and direct seeding, have become so commonplace that we forget how difficult producer acceptance once was. My congratulations go out to AESA Council and Regional Committees, municipalities and producer organizations and their rural extension staff, the many other partners in the AESA Program and AESA/Alberta Agriculture and Food staff for their efforts over the past decade. We all share a Premier's Award of Excellence and an Alberta Emerald Award for Environmental Excellence acknowledging our accomplishments.

Soil conservation remains near and dear to many of us involved in AESA because it was one of the first issues carried over from the previous initiative, the Canada-Alberta Environmentally Sustainable Agriculture (CAESA) program, to the AESA Program in 1997. It was also one of the first issues to have key BMPs, like direct seeding, with measurable rates of adoption in our producer surveys.

Efforts in soil conservation extension have their roots over 25 years ago when researchers identified a gap in soil quality between the virgin soils our first settlers farmed and agricultural soils in the 1980s. Since then, thanks to advances in technology and programs like CAESA, AESA and Reduced Tillage LINKAGES, that gap has narrowed. Many Alberta producers have adopted BMPs like direct seeding, forage rotation and continuous cropping, and have seen their soil's health improving. Organic matter, tilth, nutrient availability and moisture retention are all on the increase, far sooner than researchers expected.

Although we have made important strides forward on soil conservation, a new threat is developing.... the marketplace. The recent rise in grain prices and the reduction in cattle production could shift perennial forage acres on highly erodible soils to grain and oilseed production, possibly for biofuels. These unintended consequences of the biofuel strategy are real, and producers should be careful in managing erosion-prone soils should there be a shift to more annual crop production. The AESA-sponsored rural extension staff are a wealth of information on conservation issues and are available to consult with producers as to the sustainable management of these soils.

This Green Matters issue addresses some recent topics in soil conservation including training of rural extension staff in soil salinity control and investigating the links between agricultural practices and soil organism communities. It reminds us that, even though we may sometimes take soil conservation for granted, we must keep it on our radar screen so as to protect this most precious resource.

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Rick Tailleu



# Seeking out the Links Between Soil Organisms & Agriculture

The soil world is wildly diverse. It teems with a multitude of organisms like soil mites, nematodes, bacteria and fungi. These organisms carry out a wide variety of functions that affect nutrient cycling, soil health and crop yields. Like detectives in a mystery story, Alberta researchers are exploring how agricultural practices affect soil organism communities.

In a two-year pilot study at five Alberta sites, researchers are focusing on two components of the soil biological community:

- microarthropods, which include such creatures as spider mites, soil mites and springtails; and
- larger organisms like protozoa, fungi and bacteria.

Both components are involved in “the primary decomposition of residues and materials that are added to the field. They are at the start of nutrient cycling and nutrient availability,” explains Jason Cathcart, Soil Conservation Specialist and Coordinator of the AESA Soil Quality Program. He is a member of the pilot’s joint research team from Alberta Agriculture and Food and Agriculture and Agri-Food Canada.

Four of the sites have been selected from among the 45 long-term sites in the AESA Soil Quality Program’s province-wide benchmark monitoring program. The four sites are all in the Mixed Grass ecoregion in southern Alberta but have different agricultural management regimes. The fifth site is the long-term crop rotation study near Three Hills. Data from the 120 plots at that site allow comparisons of practices, like direct seeding versus conventional tillage.

Based on the literature, the researchers expect the soil organism communities will likely be different under different kinds of agricultural management, but exactly how they might differ is not known.

Cathcart says, “We carefully selected sites where we would expect to find differences among the soil organism communities.” The preliminary results from the pilot’s first year in 2005 suggest that there are indeed differences. If those results continue for the second year, the researchers hope to scale up the project to include additional sites from the AESA benchmark program.

To study the soil organism communities, the researchers take soil samples at the five sites

each fall. In the lab, they use a separation technique to collect the microarthropods and then identify them under a microscope. And they use a technique called phospholipid fatty acid analysis (PLFA) to identify the major categories of organisms like bacteria, fungi and protozoa.

After identifying the types and numbers of soil organisms in each soil sample, the researchers analyze how that data relates to the agricultural practices at the site.

The pilot also has a landscape dimension. Each benchmark site has long-term data for three sampling locations: upper slope, mid slope and lower slope. “The pilot is collecting samples from the upper and lower positions. That allows us to investigate whether the community of soil organisms changes as a result of different landscape positions, which means the organisms would be exposed to differences in soil characteristics (e.g., organic material and soil moisture levels),” says Cathcart.

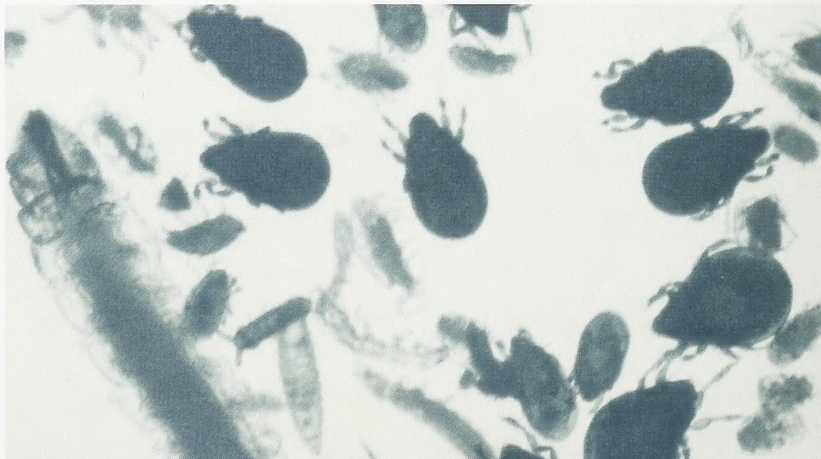
The researchers could add yet another dimension if they decide to scale up the study using other AESA benchmark sites. Cathcart explains, “We’ll be able to look at the information on a regional basis. For example, does the soil microorganism community in the Peace Lowlands differ from that in the Mixed Grasslands in the south, and if so, how does it differ?”

For Cathcart, the research is a little like being a “supersleuth”, trying to pin down which practices are stressing different types of soil organisms and which practices are helping to sustain them. “For instance, we expect that direct seeding will be less stressful for the organisms because rarely does something come in and rip their houses apart; whereas the community living in the conventional tillage system will likely be adapted to having their houses destroyed all the time. So there’s the excitement of trying to identify what communities are living at each location and why.”

## Give your soil community a helping hand

When the soil organism community is thriving, it contributes to higher crop yields and reduced crop input requirements. Cathcart outlines how some agricultural practices affect the health of soil organism communities:

- Practices that increase soil community diversity and abundance include: applying nutrients (whether as livestock manure, green manure or commercial fertilizer), controlling soil erosion, maintaining a diversity of crops, and reducing or eliminating tillage.
- Practices that decrease soil community diversity and abundance include: applying pesticides, not controlling erosion, using monoculture cropping, and frequently tilling the soil.



Soil Organisms





A training session in soil salinity investigation for rural extension staff

# Maintaining the Momentum on Salinity Control

“Soil salinity was a very major issue in Alberta in the 1980s and 1990s. [Through the efforts of Alberta Agriculture and Food and Agriculture and Agri-Food Canada staff, various municipalities and farmers,] we made some major progress in adoption of practices to slow down the spread of this serious soil degradation problem. We need to maintain that momentum,” explains Rob Dunn, Conservation Cropping Specialist with Alberta Agriculture and Food (AF). Now Dunn and others at AF are providing training and technical support so rural extension staff are better able to take on this important extension effort.

Rural extension staff (RES) are funded by AESA to work for municipalities, producer groups and others on local stewardship issues. The municipalities of Forty Mile, Cypress, Warner, Vulcan and Lethbridge have all identified soil salinity as a priority issue in their jurisdictions, and their RES are working with local farmers to deal with this issue.

Soil salinity is the accumulation of salt in the root zone, which is generally caused by high water tables. The area of salt accumulation is called a saline seep. Soil salinity is usually a slow, insidious problem that, if left unchecked, gradually reduces crop yields until the land no longer supports crop production.

Although saline soils can be caused in a number of ways, salinity extension activities focus on those salinity types that are affected by crop management or land use choices. In many situations, the key to reducing soil salinity is to grow crops that are able to lower the water table in the affected areas. Depending on the situation, that could mean using less summerfallow and more continuous cropping and/or the strategic use of deep-rooted perennial forages, like alfalfa, to lower the water table in the area that is feeding groundwater into the saline seep. And in the seep itself, a good option in many cases is to grow a mixture of salt-tolerant forages, like Altai wildrye and tall wheatgrass.

Since soil salinity is aggravated by wet weather, some southern Alberta producers have recently had to renew their battles with this problem. Dunn explains, “In the last 24 months we’ve seen a dramatic increase in salinity in southern Alberta, especially due to the very heavy rains in 2005. Although we think that some of that increase will come back into balance when we return to a more normal weather pattern, it has been an additional motivation for us to tackle this problem.”

Dunn and his co-workers are providing technical assistance on salinity to the RES in several ways.

He says, “One of the first things we did was to provide the RES with a summary of all of the past salinity investigative work that Alberta Agriculture did within their municipalities.” Detailed salinity investigations were done to determine the extent to which salinity was causing the crop-related problems, to identify the probable cause, and to recommend practices to control the salinity. In the 1980s and 1990s, Alberta Agriculture, Agriculture and Agri-Food Canada and Alberta Environment did over 400 site-specific salinity investigations.

With the information on those investigations and the practices recommended at that time, the RES have a database to help them in dealing with current salinity problems.

“Then we followed up with some salinity training sessions,” says Dunn. “The latest event was in September 2006. It was a half-day workshop followed by a half-day in the field with a farmer who is dealing with a soil salinity problem.” The participants learned about conducting a salinity investigation and some of the practical salinity control options to use when consulting with farmers in their own areas.

“We are planning to hold annual salinity training and update sessions for southern Alberta RES,” says Dunn. He adds, “There are also areas of central Alberta with serious salinity problems, so we are considering whether we need to do some training for RES in those areas who would benefit from having some knowledge about dealing with saline soil issues.”

Dunn notes, “We are still losing some ground to salinity in some areas, particularly in southern Alberta, but I think we’re probably close to turning the corner on that. If we look into the future, I’m hopeful we can turn that corner with the efforts of the RES at a municipal level and the effort that we are doing provincially.”



# Recycling Food Processing Wastes: Overcoming the Barriers

Composting [organic wastes] is the right thing to do for the environment. Throwing these wastes in a landfill creates greenhouse gases, it's not as cost-effective, and it's not as good for the environment as composting. So why not compost? That's what we're trying to figure out," says Kirstin Castro-Wunsch, the President of Cleanit Greenit Composting System Ltd.

Castro-Wunsch is talking about Cleanit Greenit's new project, funded by the AESA Processing Based Program and the National Research Council's Industrial Research Assistance Program. The project follows up on an earlier AESA-funded study conducted by Trimark Engineering Ltd. That study identified the amounts and types of waste generated by agri-food processors, the amounts diverted for other uses, and the barriers to diversion for other uses (see Green Matters, Spring 2006).

Cleanit Greenit is an Edmonton-based composting facility. "The Cleanit Greenit composting technology is an aerated static pile system, which we've designed. It's approved by Alberta Environment and meets

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"Generally our customers have found cost savings with composting as compared to landfill."

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the national standards from the Canadian Council of Ministers for the Environment," notes Castro-Wunsch. The facility recycles organic wastes into landscape products.

In Phase 1 of the project, which runs from January to the end of March 2007, the project team will be interviewing food processors to find out what the barriers are to diverting their organic wastes to a composting facility like Cleanit Greenit.

Castro-Wunsch says, "We have some idea of what some of those barriers are. For example, the food processing company might be tied into a waste contract already and they can't separate the organics, or there may be issues like loading docks not set up properly. Sometimes it's as simple as they don't know that we exist and they could be doing this. And sometimes it's just that the company is so busy with its main business that it has no time to take on something new."

In Phase 2, starting in April 2007, the project team will use the information about barriers to develop and conduct a pilot program with about 6 to 10 food processors in the Edmonton region. "We want to get them over the barriers and started [diverting their wastes to composting], and then if the economics work out at the end of the pilot, we're just going to keep it going," explains Castro-Wunsch.

She adds, "Some companies that already use our composting facility include Save On Foods, Labatt's and Molson's, and they have been doing it for years and very successfully.... Generally our customers have found cost savings with composting as compared to landfill."

**If your food processing business is interested in participating in this project, contact Kirstin Castro-Wunsch or Stacey Aidun, the project manager, at 780-488-7926.**

## Improving your farmstead's environment

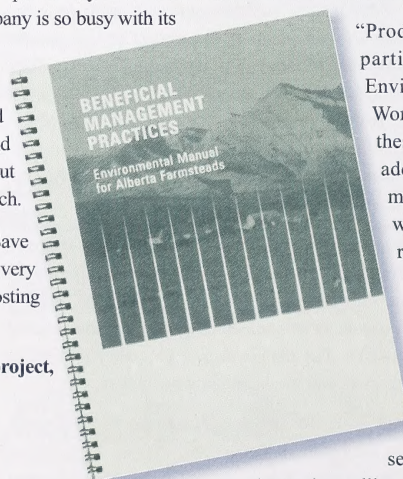
Would you like to make your farmstead safer and healthier? The Beneficial Management Practices Environmental Manual for Alberta Farmsteads can help.

This new manual is the final one in a series of seven beneficial management practices (BMP) manuals developed for rural Albertans. The other six manuals focus on various commodity areas and are designed for producers. The Farmsteads manual is unique in that it applies to farmstead and acreage owners as well as producers.

"This manual helps people gain a greater understanding of environmental risks associated with their farmsteads, and it provides management options to reduce those risks," says Roger Bryan of Alberta Agriculture and Food (AF). "It addresses potential environmental risks associated with water supplies, as well as the storage and handling of pesticides, fuel and fertilizer." Other topics in the manual include farmstead wastes, household wastewater, nuisances such as dust, odour and noise, and energy efficiency. And each chapter includes contact information for agencies that can provide more information on the topic.

"Producers who have participated in an Environmental Farm Plan Workshop may notice that these topics are familiar," adds Bryan. "That's no mistake! This manual was prepared to be a resource for producers who have completed or are completing their Environmental Farm Plans."

This manual and the others in the BMP series are available free of charge by calling AF's Publication Office (1-800-292-5697). They can also be downloaded from the AF website ([www.agric.gov.ab.ca](http://www.agric.gov.ab.ca)).





"Alberta's food processing sector is amongst the largest manufacturing sectors in the province, rivalling the manufacturing of petroleum products and chemical manufacturing. It is also a very large employer for the province, and the value of [food and beverage] shipments is over \$9 billion annually," says Ken Gossen, Director of the Food Processing Development Division at Alberta Agriculture and Food.

The Division is a catalyst for the continued growth of this vital sector. "Our role is to provide scientific and technical assistance to the food processing industry in Alberta related to developing new products and processes," Gossen explains.

Along with the Food Processing Development Centre at Leduc, the Division's facilities include the Sensory Evaluation Centres in Edmonton and Leduc, the Food Science and Technology Centre at Brooks, and the new Agrivalue Processing Business Incubator at Leduc.

"The food industry is a very capital-intensive business because of the regulatory environment that it has to operate in. We're providing technical assistance to the processing industry to overcome some of the hurdles, thereby increasing the potential for successful new product launches and growing this important industry," says Gossen.

Gossen's career includes experience in many areas of the agriculture and food industry. He grew up on a dairy farm south of Swift Current, Saskatchewan. After graduating from the University of Saskatchewan he worked in the private sector until joining the Alberta Government in 1994

## COUNCIL PROFILES

### Ken Gossen



where he has held various positions mostly related to the food-processing sector. In September 2006, he became Director of the Food Processing Development Division.

As the new chair of the AESA Processing Based Committee, which guides the AESA Processing Based Program, Gossen's insight and experience will be a definite

asset. The AESA Processing Based Program has been assisting agri-food processors to develop and adopt more environmentally friendly processing practices and policies since 1997. Reducing the environmental impact of the agri-food processing industry in the province is the driver of this program.

"I believe it's very important for processors to consider the environmental impact of their business," says

Gossen. "Many types of food processing activities use a large amount of energy and water. Anything that we can do to reduce the power costs to the plant, reduce wastes and reduce the impact on water, will go a long way to improving the competitiveness of our industry."

Visit [www.aesa.ca](http://www.aesa.ca) for more information about the Processing Based Program.

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## The Alberta Environmental Farm Plan Company

Increasing awareness and adoption of environmental stewardship practices is at the heart of the Alberta Environmental Farm Plan (AEFP) Company. This non-profit company focuses on implementing the Environmental Farm Plan (EFP) initiative in Alberta.

Participation in the industry-run, industry-endorsed EFP program is growing every year, as more and more Alberta producers see its value to their own operations. "Environmental Farm Plans are a management tool that farmers use to identify what they are doing well from the point of view of environmental stewardship and to identify opportunities to improve by adopting industry-accepted beneficial management practices," explains Mike Slomp, the company's Executive Director.

The EFP process is voluntary, confidential and farmer-friendly. Through a combination of two workshops and a few hours of homework, producers complete a series of checklists to identify their operation's environmental risks and strengths, and then develop a plan to address any risks. The plan is their own – they determine the priorities and timelines, and they control who sees it.

Partnerships are key to the AEFP Company's success. For example, the company has 23 member organizations. These agricultural and stewardship agencies give the company its solid grassroots

connections. Seven of the AEFP Company's nine-director board are elected from these partner organizations. The other two directors are representatives of the Government of Canada, providing core funding and technical support for the program, and the Alberta Government, which provides major in-kind technical support.

The company's representation on agencies like AESA Council also provides another avenue for building strong partnerships to achieve mutual goals. Glenn Logan represents the company on AESA Council.

Another key to the company's success is its Alberta-wide network of trained facilitators and team leaders. "They bring about local community support and engagement. ... There's this old adage that, whether you're buying an idea or a box of soap, you buy from people you know, like and trust. The facilitators, team leaders and technical assistants are building trust in the local community, so decision-making at the farm level is comfortable and confident. And that facilitates improvements on the farm, which is what the EFP initiative is all about."

For more information about the company, visit [www.albertaefp.com](http://www.albertaefp.com).



# User-friendly Soil Landscape Information

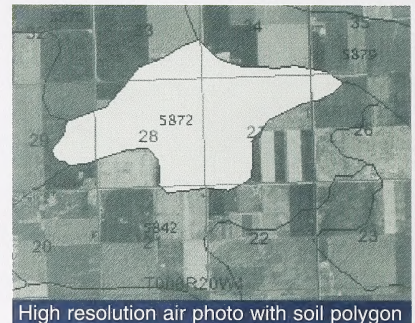
Information about soil and landform characteristics for any location in Alberta's 64 million-acre agricultural land base is just a couple of clicks away with the Alberta Soil Information Viewer. Producers, agrologists and other land resource managers can use this free, online, easy-to-use viewer in a wide variety of practical applications.

The viewer marries the AGRASID soils database of Alberta's agricultural area with high-resolution air photos. That combination allows you to see soil characteristics in the context of other landscape elements, like lakes, creeks, hills, woodlots, buildings and roads, and to bring these elements together in your planning and decision-making. And, to help you get started, the viewer has tours and case studies to walk you through examples of applications, while demonstrating how to use features like its drawing and calculator tools.

Alberta Agriculture and Food, Agriculture and Agri-Food Canada, and private consultants worked together to develop the viewer. "To my knowledge there isn't anything else quite like this viewer in Alberta. There are examples in the private sector that you have to pay for, and there are examples of internal applications that other departments have developed. But there is no other public one, that I'm aware of," says David Spiess, a Resource Data Engineer at Alberta Agriculture and Food.

Spiess outlines some of the viewer's many highlights. "One highlight is the fact that it has user-friendly landscape descriptions. Producers can get information about their farmland in

language that agrologists and soil scientists will understand. That's really important in enabling them to carry out their plans – whether it's an Environmental Farm Plan, or a fertilizer program, or if they are looking to buy similar land. ...They can say, 'According to this application, my land has this, this and this characteristic.' And the land resource advisors can make inferences based on how it's described because it's in a language that ties into their expertise."



**"To my knowledge there isn't anything else quite like this viewer in Alberta."**

"Another neat feature is that it's very easy to locate yourself with the viewer. As long as you know your land's legal location, you can very quickly, with the search tools and the spatial layers provided, get to your land and see what it looks like."

As well, the viewer's area and distance calculator and its text and line mark-up tools allow you to do a lot more than just view information. For example, you could work out the area available for manure spreading by marking the required setbacks from water bodies, and then use the calculator to determine the area remaining in the field. Or you could draw a planned fence to keep cattle out of a waterway or dugout and use the calculator to determine the fence's length, so you can work out how much wire and how many posts would be needed. Once you're done

your map work, you can print and save a copy of your map!

It's no wonder the viewer is very popular. "In the last quarter of 2006, the Alberta Soil Information Viewer averaged about 2000 visits per month. In the first seven days of 2007, there were some 662 visits," notes Spiess. In about 80% of those visits, the users printed out maps from their sessions, suggesting that they're finding enough value in their sessions to want a record of them.

To access the Alberta Soil Information Viewer, go to: [www.agric.gov.ab.ca/asiv](http://www.agric.gov.ab.ca/asiv).

Green Matters, Issue No. 30, Winter 2006  
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Aussi disponible en français.

Green Matters is the newsletter of the Alberta Environmentally Sustainable Agriculture (AESACouncil). AESACouncil consists of representatives from Alberta's agriculture and food processing industry, environmental organizations and municipal, provincial and federal governments.

AESACouncil's vision is that Alberta has a thriving agriculture and food industry that is operating in an environmentally responsible manner. Its mission is to lead the agriculture and food industry in addressing environmental challenges. And its goal is to develop and deliver collaborative environmental stewardship initiatives that result in sustainable growth of Alberta's farm, ranch and agri-food processing industry.

The purpose of Green Matters is to provide a forum for discussion of environmental issues in Alberta's agriculture and food processing industry.

To subscribe to Green Matters, call 780-422-4385. Green Matters is also available online at <http://www1.agric.gov.ab.ca>.

Editorial Board: John Kolk, Bruce Beattie, Murray Klutz, Terry Rachuk  
Editor: Roger Bryan  
Contributors: Carolyn King, Larry Kitz, Terry Rachuk  
Design and Typesetting: P40 Visual Communications

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The Agricultural Policy Framework (APF) – A Federal-Provincial-Territorial Initiative